(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 April 2001 (12.04.2001)

PCT

(10) International Publication Number
WO 01/26393 A1

(51) International Patent Classification⁷: H04Q 7/20

(21) International Application Number: PCT/US00/26727

(22) International Filing Date:
29 September 2000 (29.09.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/411,446 1 October 1999 (01.10.1999) US

(71) Applicant: SIGNALSOFT CORP. [US/US]; 1495 Canyon Boulevard, Boulder, CO 80302 (US).

(72) Inventors: HOSE, David, A.; 7358 Park Circle, Boulder, CO 80301 (US). FITCH, James, A.; 827 Walnut Street, Edmonds, WA 98020 (US).

(74) Agent: FISCHMANN, Kent, A.; Marsh Fischmann & Breyfogle, LLP, 3151 South Vaughn Way, Suite 411, Aurora, CO 80014 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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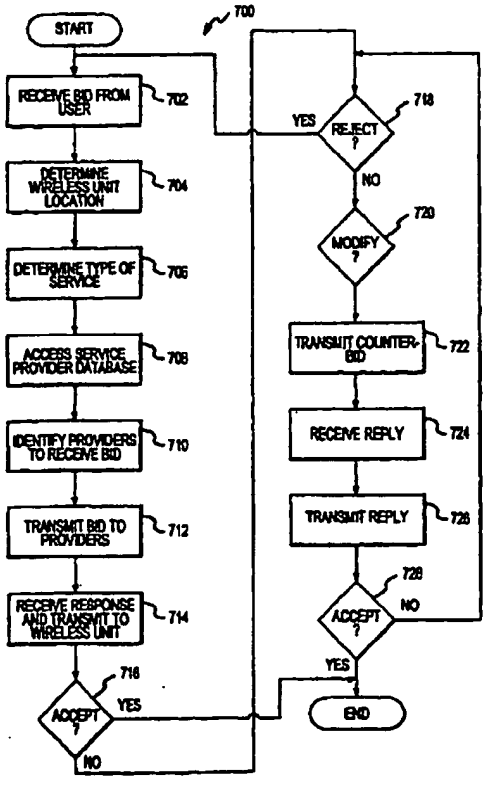
(54) Title: LOCATION BASED AUCTIONING SERVICES FOR WIRELESS NETWORKS




(57) Abstract: Enhanced interactive commerce transactions, such as auction style transactions are supported in communications networks including wireless networks by making use of the location of subscriber equipment such as a wireless unit. In one implementation, a location-based services application receives (702) a bid from a network user. The application then determines (704) the location of the subscriber equipment, determines (706) the type of service for which the bid is submitted, and identifies (710) a number of providers to receive the bid. The providers may be identified based on proximity to the wireless unit. The application then transmits (712) the bid to the identified providers and receives (714) an acceptance, rejection or modification of the bid. The invention thus provides interactive commerce type functionality in a variety of communications networks and provides a unique location-based interactive commerce capability for communications networks including wireless networks.

WO 01/26393 A1

**Published:**
— *With international search report.*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# LOCATION BASED AUCTIONING SERVICES FOR WIRELESS NETWORKS

## Related Application Information

This Application is a continuation-in-part of U.S. Patent Application Serial Number 09/119,493 entitled "Subscriber Delivered Location Based Services" filed on July 20, 1998, which is incorporated herein by reference.

## Field of the Invention

The present invention relates in general to location-based services for communications networks and, in particular, to the provision of auction-style commerce capabilities in a communications network based on the location of a transceiver used to request services. The invention is particularly useful for placing a bid for local services in a wireless communication network.

## Background of the Invention

Wireless telecommunications networks generally allow for communications involving at least one subscriber wireless transceiver e.g., a wireless telephone (analog or digital cellular and PCS), pager or data terminal that communicates using RF signals. In recent years, a number of location-based service systems have been implemented or proposed for wireless networks. Such systems generally involve determining location information for a wireless transceiver and processing the location information to provide an output desired for a particular application.

Examples of such existing or proposed applications include emergency or "911" applications, location dependent call billing and vehicle tracking. In 911 applications, the location of a transceiver is determined when the transceiver is used to place an emergency call. The location is then transmitted to a local emergency dispatcher to assist in responding to the call. In typical location dependent call billing applications, the location of a transceiver is determined, for example, upon placing or receiving a call. This location is then transmitted to a billing system that determines an appropriate billing value based on the location of the transceiver. Vehicle tracking applications are used, for example, to track the location of stolen vehicles. In this regard, the location of a car phone or the like in a stolen vehicle can be transmitted to the appropriate authorities to assist in recovering the vehicle.

While such applications or proposed applications have generated considerable excitement in the industry, there is a desire to expand the functionality of such applications.

## Summary of the Invention

The present invention is directed to enhancing interactive commerce transactions, such as auction style transactions, in communications networks including wireless networks, by making use of the location of subscriber equipment such as a wireless unit. It has been recognized that the functionality of location based services can be significantly expanded by providing for interaction between the subscriber equipment and the equipment implementing the location based services, i.e., by receiving a service request from the subscriber equipment, obtaining location information for the subscriber equipment, and delivering responsive service information to the subscriber equipment. For example, the service request may seek information regarding local service providers or provide a bid for local services, and the responsive service information may provide a list of the closest appropriate service providers or a response from a local service provider to a bid for services.

It will be appreciated that the present invention provides unique capabilities in the context of a wireless network. Because of the mobile nature of wireless units, subscribers of wireless networks may often desire to obtain local services, but may have little knowledge of local service providers. It has been recognized that providing information regarding local service providers may therefore be valuable to wireless subscribers.

Providing such information requires, among other things, knowledge of the location of the subscriber unit. Such location information is increasingly available due to the emergence of conventional location-based services as noted above. However, such location-based services have generally been unilateral in nature, i.e., they have been limited to obtaining a location and then acting upon the information (routing a call, reporting to police, or assigning a call rating value) without wireless unit/network interaction. The present invention makes use of available location finding technologies to provide enhanced interactive service functionality.

In addition, with the emergence of e-commerce, certain market segments have begun to realize the potential benefits of interactive commerce transactions. However, such transactions have generally been location independent (e.g., bidding for a product or service without regard to the location of the buyer or seller) or have required the bidder/buyer to specify the location where the goods/services are desired and/or to specify the identity of the seller/service provider (e.g., bidding for a hotel room in a given city or at a given hotel on a given date). Such interactive functionality is of little value to users who may be uncertain of their own location and of the identity or location of local service providers. The present invention makes interactive e-commerce type functionality available to a new market and provides a unique location-based interactive commerce capability.

It has also been recognized that the functionality of location-based services in wireless or other communication networks can be enhanced by personalizing the services provided, that is, by processing a location-based service request based, at least in part, on stored information regarding the subscriber. Such subscriber information may include, for example: account numbers, credit card numbers or other financial information; lodging information such as smoking preference, room requirements, pricing limitations, discount programs, etc.; favorite restaurants; automobile service plans; and/or a wide variety of other subscriber information. Such information allows the location based services to be tailored for the subscriber. In addition, such information allows the subscriber to direct transmission of sensitive information via secure channels. Either or both of these interactive and personalized characteristics can be provided in accordance with the present invention.

According to one aspect of the invention, a method is provided for implementing interactive location-based services in a wireless communications network such as a cellular or PCS telephone network or a data network. The method involves receiving a service request transmitted by a network subscriber using a wireless transceiver or otherwise receiving a subscriber location input. For example, in a wireless telephone network, a service request may be transmitted using a designated keypad service code (e.g., *TRAFFIC, *HOTEL, *TOW, *PIZZA, *ATM, etc.) or, in the case of an enhanced phone, by scrolling through a menu or otherwise

entering a menu selection. Other ways of transmitting a service request include entering a command by voice or touchpad. Alternatively, an input may be received based on other transceiver/network communications such as upon registration or periodic polling conducted for call routing purposes. The method further involves obtaining subscriber location information and selecting service information based on the location information and the service request.

The location information may be based on an output from any suitable location finding equipment (LFE) or a combination thereof. Examples of such LFE's include network based systems that determine transceiver location based on analysis of signals communicated between network equipment and the transceiver, e.g., cell/sector, microcell, angle of arrival (AOA), time of arrival (TOA) and/or time delay of arrival (TDOA) systems, and external systems that determine location based on signals from external sources, e.g., Global Positioning System (GPS) signals. Such LFE inputs may be used in raw form or, more preferably, may be processed in conjunction with other LFE inputs, mapping information or the like to provide enhanced location information. The location information can thus be compared to stored data relative to the service request to identify service information responsive to the service request. For example, if the service request was a traffic inquiry, responsive service information may include any available traffic information for the subscriber's location, or a menu of available traffic information, e.g., indexed by road and travel direction. In the case of a lodging request, the service information may relate to the nearest hotel or a menu of local hotels satisfying certain criteria as will be understood from the description below. Alternatively, the delivery of service information may be initiated by a network administrator or third party. For example, in the case of a traffic accident, local evacuation or other emergency, the appropriate authorities may direct an emergency message to all transceivers within a specified area. Similarly, the delivery of service information may be initiated by a vendor or agent. For example, a message may be transmitted to all or selected transceivers within a specified area to provide sales information such as an instant price reduction (e.g., to fill hotel rooms at the end of the evening or otherwise dispose of unused inventory), or to notify a subscriber of the availability of a car for a test drive, or a suitable home for sale.

The method further involves outputting the selected service information to the subscriber via the wireless transceiver. In this regard, the selected service information may be provided or made available to a network data server or other voice or data network components for transmission to the transceiver, e.g., via a mobile switching center (MSC), intelligent peripheral, adjunct processor or other Service Control Point or data network structure. The service information can be provided to the user on a visual display of the transceiver, as an audible, recorded message, or through any other appropriate means. In cases where the service information is provided as a menu of selections, the method may further involve receiving a menu selection entered by the user and outputting further service information in response to the menu selection. If desired, the subscriber may be directly connected to a service provider as a result of the service request. By virtue of the interactive nature of such service request processing, the functionality of information based services can be greatly increased. In addition, service providers and advertisers may be allowed access to large numbers of wireless network subscribers on a location-dependent basis, thereby creating or enhancing a market for a variety of location based services.

The service may be further refined by using LFE outputs to identify the location of a target service provider. For example, the subscriber may desire to locate a mobile service provider such as a nearby taxi or courier. In other cases, a network administrator may allow service providers to register in a location-based service provider database using a wireless transceiver. In such cases, LFE(s) may be used to determine the location of the service provider based on the registration communications and the appropriate location information can be indexed to the service provider in the service provider database. In either case, the delivery of location-based service information to the subscriber may involve receiving an LFE-based input regarding the service provider's location and providing service information to the subscriber based on the LFE based input regarding the service provider's location. Optionally, both the location of the subscriber and the location of the service provider may be determined based on LFE inputs and the service information may be delivered to the subscriber based on both such inputs. In this regard, a network administrator may generate revenues based on fees charged to the

service provider and/or subscriber in connection with accessing the location-based services system, for example, on a per-use or periodic basis.

According to another aspect of the present invention, a method is provided for implementing personalized location-based services in wireless or other communications networks. The method involves: receiving a service request from a network user requesting access to a location based service; obtaining location information for the user based on the origination location of the service request, e.g., wireline network node or wireless transceiver location; accessing stored user profile information for the user based on the service request; using the location information and the profile information to determine user service information responsive to the service request and providing an output including the user service information.

The profile information may include any of various recorded personal data for the user. For example, such information may include financial, lodging and other information as described above, or any other information useful in personalizing location-based services. Such profile information can be used to identify service information responsive to a service request (for example, the nearest hotel meeting the lodging criteria stored in the user's profile) or in otherwise processing a service request (for example, transmitting credit card information from the user profile to a selected hotel). The output may be provided to the user and/or to a third-party. In this manner, the profile information can be used in combination with the location information to personalize location-based services. The invention further includes location-based service apparatus generally corresponding to the interactive and personalized location based service methodologies as set forth above.

According to a further aspect of the present invention, a wireless network subscriber may identify a number of the closest service providers for a particular type of services. For example, the subscriber may obtain a list of the closest predetermined number of service providers, the subscriber may select the size of the list, i.e., the closest five service providers, or the subscriber may receive a list of all appropriate service providers within a selected distance or travel time of the subscriber's location or within a selected geographic area. Alternatively or additionally, information from or otherwise regarding the user may be transmitted to each of the identified providers.

The corresponding method includes the steps of: obtaining a location of a wireless unit; based on the obtained location, identifying a number of providers for providing a first type of goods or services; and, after identifying the providers, transmitting user information regarding the user to each of the providers and/or transmitting provider information regarding each of the providers to the user. In this manner, a list of local providers may be transmitted to the user or user information such as a bid for goods or services may be transmitted to local providers.

According to a still further aspect of the present invention, a method is provided for establishing interactive commerce transaction capabilities making use of the location of subscriber equipment such as a wireless unit. The method includes the steps of: receiving a transaction bid entered using subscriber equipment of a communications network, where the bid includes information identifying a type of goods or services that are the subject of the bid and a price the subscriber is willing to pay; obtaining a location of the subscriber equipment; based on the obtained location of the subscriber equipment, identifying a number of providers of the identified type of goods or services; transmitting bid information to each of the number of identified providers, where the bid information includes at least price information identifying the bid price; and receiving a response from at least one of the providers, where the response includes responsive information indicating one of acceptance, rejection or a proposed modification of the price. In the context of a wireless network, the location of the subscriber equipment can be determined based on a known cell sector of the subscriber equipment or based on location information received from location finding equipment. The invention thus provides interactive commerce type functionality in a variety of communications networks and provides a unique location-based interactive commerce capability for communications networks including wireless networks.

## Brief Description of the Drawings

For a more complete understanding of the present invention and further advantages thereof, reference is now made to the following Detailed Description taken in conjunction with the drawings, in which:

Figure 1 is a diagram of a wireless telecommunication system for implementing interactive and personalized location-based services in accordance with the present invention;

Figure 2 illustrates an example of signal communications between the various elements of the telecommunication system of Figure 1 in accordance with the present invention;

Figure 3 is a flowchart illustrating an interactive and personalized location-based service process in accordance with the present invention;

Figure 4 is a diagram of a wireless telecommunications system for implementing interactive and personalized location-based services in accordance with an alternative implementation of the invention;

Figure 5 is a diagram of a wireless telecommunications system for implementing further interactive location-based services in accordance with the present invention;

Figure 6 is a flow chart illustrating an interactive location-based service process in accordance with the present invention involving identification of a number of product/service providers; and

Figure 7 is a flow chart illustrating a location-based auction process in accordance with the present invention.

## Detailed Description

In the following description, the invention is set forth in the context of specific interactive and personalized location-based service systems implemented in a wireless telecommunications network. However, it will be appreciated that certain aspects of the present invention are more broadly applicable to other subscriber delivered or personalized location-based services and to other types of communications networks including wireline communications networks such as voice and/or data networks. In addition, although certain characteristics of the invention will be described in relation to an intelligent telecommunications network, it will be appreciated that the invention is not limited to such implementations. The discussion below first describes certain structure and process involving delivering information to a wireless unit, then

describes certain structure and processes involving identifying multiple service providers, and finally describes certain structure and processes for implementing location based auctioning services.

Referring to Figure 1, a wireless telecommunications network implementing an interactive and personalized location-based service system in accordance with the present invention is generally identified by the reference numeral 100. Although not shown, the network 100 is divided into a number of service areas or cells. Each cell includes cell site equipment 108 for receiving RF signals from wireless telephones 102 of network subscribers and transmitting RF signals to the wireless telephones 102. The cell site equipment 108 of multiple cell sites are, in turn, connected to a Mobile Switching Center (MSC) or other data or voice switch 110, typically by wireline connections. Among other things, the switch 110 is used in establishing voice channels for communication between the calling and called phones. The switch also provides information for generating call detail records or other billing records.

In connection with the switch 110, one or more processing platforms 112 are generally provided for implementing a variety of subscriber or network service functions. For example, the processing platform 112 may implement an application for routing a call based on subscriber data. In the illustrated embodiment, the platform 112 is used to run logic for implementing the interactive and personalized location based services as will be described in greater detail below.

In this regard, the illustrated platform 112 includes ports for accessing and receiving optional subscriber profile information 114, LFE inputs 116 and service information 118. The subscriber profile information 114 includes information regarding individual subscribers that is useful in personalizing the location-based services and in processing individual service requests. Some examples of such information include: 1) financial information for use in executing a location-based service transaction such as credit card numbers and expiration dates, bank account numbers, or corporate account information; 2) service preference information such as hotel room requirements, information regarding discount programs or club memberships, and preferred chains or other service providers; 3) information regarding the subscriber's service usage profile such as typical travel times and roads,

types of services most often requested by the subscriber and demographic information; and 4) the subscriber's willingness or desire to receive complementary service information and advertisements. Such profile information may be entered by a carrier or other location-based service administrator upon signing up for the service and may be periodically revised or automatically revised based on adaptive logic.

The LFE input(s) 116 may be provided in various forms. As noted above, many types of LFEs are available. In most cases, such LFEs determine the location of the telephone based on analysis of signals transmitted between the telephone system and one or more cell sites, e.g., cell/sector, microcell, AOA, TOA, TDOA, etc. In such cases, the LFE may receive information from the wireless telephone 102, the cell site equipment 108, and/or the switch 110. In other cases, the telephone location is determined by reference to an external system such as GPS and the LFE may receive information from a GPS transceiver embodied in the telephone 102. The particular system or systems used determines the nature and accuracy of the received data. As described in co-pending application Serial No. 60/106,816, which is incorporated herein by reference, the illustrated platform 112 preferably receives information from multiple (two or more) LFEs and implements logic for using the multiple inputs to provide enhanced location information. In this regard, such logic may select, from among the multiple inputs, the best information for a particular application (most timely, most reliable, most accurate or best availability based on terrain/climate) and/or may process multiple inputs to obtain enhanced position information that is more accurate, more reliable or more informative (e.g., includes derivative information such as travel direction/rate) than single inputs. In addition, such logic may process the LFE 116 inputs relative to mapping information such as GIS data and/or service zones of a particular service provider to yield processed information data.

The illustrated platform 112 also accesses and receives service information 118. Various types of service information may be provided for various location-based services. For example, for services such as locating food outlets, hotels, service stations, towing services or other service providers in the vicinity of the subscriber, the service information may include a database of service providers indexed to

corresponding service locations. Such service locations may be stored in the form of latitude/longitude data, corresponding GIS or street address data, zip codes or other regional/service area indicators, or any other appropriate identifiers. For other types of services such as, for example, traffic or road conditions, stored information for particular areas or locations may be updated on a regular basis or, alternatively, the platform may be linked to an external source of real-time or near real-time information. Alternatively, as described in more detail below, the service information may involve stored or substantially real-time information regarding the location of a service provider.

The subscriber profile information 114, service information 118 and LFE information 116 or enhanced position information is used in the illustrated implementation of the present invention to provide location-based service information. It will be appreciated that this location-based service information can, optionally, be personalized based on the subscriber profile information 114. For example, in the case of providing local food outlet, service station or hotel information, the location-based service information can include not only information regarding service providers in the vicinity of the subscriber, but can also identify local service providers or services meeting criteria specified by the profile information 114. The location-based service information may therefore identify a local hotel that has a four star rating and conference rooms, and that accepts credits cards and participates in a particular corporate discount plan, or it may identify the closest ATM machine that does not charge a transaction fee.

The illustrated network 100 also includes a data server 120 associated with the platform 112 and the switch 110. The data server 120 provides an interface by which information can be communicated between the platform 112 and subscribers or third parties. The data server 120 may also receive signals from the switch 110 such as call start signals, call stop signals and the like that may be transmitted to billing systems or other applications. As shown, the data server 120 receives an input from the platform 112 that may include location-based service information to be transmitted to the subscriber or third parties. In the case of location-based service information (such as the location of a local service provider or a menu of service providers) to be

transmitted to the subscriber, such information is communicated to the subscriber via the switch 110 and cell site equipment 108. More specifically, upon receiving a service request, the switch transmits service request information to an application associated with platform 112. The application responds with call routing information that prompts the switch 110 to establish a communication channel between the phone 102 and the data server 120. This channel is then used to communicate the location-based service information from the data server 120 to the phone 102 for audible or visual presentation to the subscriber.

The data server 120 may also or alternatively be used to transmit data to third parties such as an identified service provider 124. For example, upon identification of the service provider 124 based on the subscriber's service request, the subscriber may request a direct voice connection to the service provider 124 or may request that financial information or other data be transmitted to the service provider 124 to process a service transaction. In this regard, an appropriate voice and/or data link 122 may be established between the data server 120 or the switch 110 and the service provider 124 via the network 100 and/or a further network such as the Internet. It will thus be appreciated that the interactive location-based service process of the present invention may involve a series of communications with the phone 102.

The illustrated phone 102 is an enhanced phone, i.e., a phone adapted for voice and data communication with a built-in processor. The phone includes a conventional keypad 106, a roller ball, arrow keys, touchpad or other data input device 104, and a screen 105 for displaying data. In this manner, the subscriber can enter service requests via the keypad 106 or data input device 104, and can receive service information audibly or via the display 105.

Figure 2 illustrates an example of a series of signals that may be transmitted between the various elements of the network in connection with a particular location-based service process. As shown in Figure 2, the process is initiated with a service request 200 transmitted from the telephone to the platform by way of the cell site equipment and switch. The service request may be entered for example, via the telephone keypad or by using the input device. For example, in a wireless network, particular service requests may be associated with a specific keypad entry such as

*TRAFFIC, *HOTEL, TOW, *PIZZA, *ATM, etc. Alternatively, a menu of available location-based services may be programmed into the telephone for selection using the data input device using protocols such as The Wireless Application Protocol (WAP). Certain identification information may also be transmitted with the service request. In response to receiving the service request, the application associated with the platform transmits routing information and transmits a validation 204 to the switch. This routing information prompts the switch to establish (206) a communication channel with the correct data server.

Once this data channel is established between the switch and the data server, the location-based service application of the present invention can communicate with the telephone via the data server and/or the switch. In this regard, location-based service data 208 is transmitted from the platform to the data server. In the illustrated case, this location-based service data 208 includes a menu of local service providers based on the service request. This service data menu is communicated (210) from the data server to the telephone via the switch and cell site. For example, the menu may include a selection of hotels in the vicinity of the subscriber. This menu is displayed on the telephone such that the user can scroll through the menu and make a selection using the telephone's input device. This selection is then transmitted from the telephone to the platform via the cell site and switch.

The signal flow diagram of Figure 2 illustrates a case where the subscriber directs profile information to be transmitted from the platform to the service provider. For example, the subscriber may direct the location-based service application running on the platform to transmit credit card or other subscriber information to a selected hotel or other service provider in order to consummate a transaction. As shown, such subscriber information is transmitted from the platform to the service provider by way of the data server. The service provider may then transmit a confirmation signal in response to the subscriber information. The confirmation signal 216 is routed to the platform by way of the data server. The application can then notify the subscriber that the transaction has been completed. As shown, this is accomplished by transmitting a transaction complete signal 218 from the platform to the data server and then from the data server to the telephone (220) via the switch and the cell site.

Figure 3 illustrates a process implemented by the location-based service system of the present invention. The system may be installed, for example, at the platform associated with the switch. The illustrated process is initiated by receiving (300) a service request from the subscriber telephone indicating that a particular location-based service is desired. In response to the received request, the system accesses and receives (302) LFE data and service provider data. This information provides an indication of the subscriber's current location as well as the locations of various service providers. The system compares the received LFE data and service information to identify (304) candidate service providers based on location. Any suitable technique can be employed in this regard. For example, the system may determine the location of the subscriber telephone, identify a service area relative to that location and compare the service area to a service provider database to identify service providers (of the type indicated by the service request) in that area. The service area may be defined based on the subscriber telephone location (e.g., a radius search for service providers within a given radius of the telephone location) or the service areas may be predefined. In the case where the service areas are predefined, the relevant service area can be determined, for example, by identifying the service area in which the subscriber telephone is located (e.g., a point-in-polygon analysis).

In the illustrated implementation, the subscriber profile is used to identify one or more appropriate service providers from the candidate service providers. Specifically, the system first selects (306) a candidate provider from the list of candidate service providers. The system then retrieves (308) the subscriber profile information and compares (310) the candidate provider to the profile information. If such comparison indicates a match (312), the candidate service provider is added (314) to a menu to be provided to the subscriber. This process is repeated until all candidate service providers have been analyzed. Once the menu of service providers is complete (316), the menu is transmitted (318) to the subscriber telephone where the menu is displayed or otherwise provided to the subscriber. The menu may be ordered based on any of various criteria such as the preferences expressed in the subscriber profile, nearest to farthest, preferred service providers defined by the network administrator, etc. In response, the subscriber selects a service provider from the

menu and the selection is received (320) by the system. The subscriber may further indicate a desire to contact the selected subscriber to consummate the transaction. In this case, subscriber information such as a credit card number and expiration date is transmitted (322) to the service provider. The service provider may also be prompted to return a transaction confirmation. This confirmation is received (324) by the system and, in turn, transmitted (326) to the subscriber to complete the process.

It will be appreciated that revenues may be generated from the subscriber and/or service providers based on use of the location-based services system. In this regard, the subscriber and service provider may be charged a flat fee, for example, on a monthly basis. Alternatively, fees may be based on usage, e.g., number of uses, duration of uses, type of uses, etc. In the latter case, the location-based services application running on the network platform may be programmed to provide an appropriate billing program output in connection with service requests or location based service transactions. For example, the location based services application may cause available fields of a call detail record or other billing record to be populated with the appropriate billing parameters (for example, a subscriber identifier, a service provider identifier, a service type identifier, etc.). Such records are commonly transmitted by the switch to the billing program in connection with each call. Cooperating routines of the billing program can then be used to create bills for the subscriber or service provider based on the service request or transaction.

Figure 4 shows an alternative implementation of the present invention in a telecommunications network 400. The network 400 includes cell site equipment 402 for communicating with a subscriber's wireless telephone 404, and an MSC or other voice and/or data switch 406 and a processing platform 408 as described above. In addition, the network 400 illustrates a number of implementation options in accordance with the present invention. These include obtaining service provider location information via an LFE input 410, providing a voice system 414 such as a Short Message System (SMS) or Interactive Voice Response (IVR) system to provide audible or voice messages to the telephone via the switch 406 and thereby optionally avoiding the need to establish communications with a data server 412.

In a variety of contexts, it may be desirable to obtain stored or substantially real time information regarding the location of a service provider 416 via an LFE input 410. For example, in the case of a mobile service provider such as a taxi, courier or police unit, it may be important to determine a current location of service provider 416. In other cases, it may be expedient to allow a stationary or mobile service provider with a wireless transceiver to enter or update its location via an LFE input 410. In either case, such self-provisioning of the service provider location information can be provided by using the LFE equipment associated with the network 400. For example, a network administrator such as a wireless carrier may provide a registration process for service providers whereby the service providers call-in on a wireless telephone to register in a service provider database that is accessed by the location-based services program running on the platform 408. Based on this call, the LFE can be operated, as generally indicated by broken line 418, to provide an LFE input 410 indicative of the location of the service provider 416. In the case of a mobile service provider, the LFE may continuously or periodically monitor the location of the service provider 416 to provide an LFE input 410 indicative of the service provider's current location. It will thus be appreciated that the illustrated implementation may involve first operating (418) the network LFE to obtain a first LFE input 410 regarding the location of a service provider 416 and second operating the network LFE, as generally indicated by broken line 420, to obtain a second LFE input 410 regarding the subscriber's phone 404, e.g., upon receiving a service request.

Figure 4 also illustrates the use of a voice system 414 to provide an audible or voice message. For example, the voice system 414 may store a library of such messages for various service providers or may be operable to generate such messages in response to a service request, e.g., "The nearest ATM is located at [address]." The voice system 414 can be provided in conjunction with the platform 408 to allow for responding to the service request via the switch without the need to establish a separate communications channel with a data server 412. If desired, however, the response may be transmitted to the subscriber using the data server 412 or both the data server 412 and voice system 414.

The service request from the subscriber and response from the voice system 414 and/or data server 412 need not take place during a single call/communication. In this regard, the subscriber may transmit a service request and hang-up, or the location-based services program may receive the service request, transmit an acknowledgment and then generate a hang-up signal. In either case, the program may obtain and store a phone number or other subscriber identifier and, thereafter, process the service request, obtain location-based service information and cause the service information to be transmitted to the subscriber's phone 404, pager, wireless data terminal or other wireless transceiver. For example, at some time after the service request is transmitted and that call has been terminated, perhaps 30 seconds later, an address or other information responsive to the subscriber may be transmitted. In the case of a telephone, a "ping" ring, light or other indication may be used to notify the subscriber that the information is available.

In many cases, it may be desirable to identify a number of providers for providing a given type of goods and services. For example, and as described in more detail below, a user may desire to receive a list of appropriate providers in the vicinity or the user may desire to place a bid for goods or services that may be accepted by any of a number of local providers. Figure 5 illustrates a network for implementing such services. The network generally corresponds to the network of Figure 1 and, in that regard, includes a wireless unit 502 for communicating with cell site equipment 504 via an air interface, a switch 506, a data server 510, one or more LFEs 512 and a platform 508 for running the location based services. In addition, the network 500 includes a provider database 516 including files 518 for each provider that is registered in the network. As shown, each file 518 may include an identifier identifying the provider, an indication of the type of products or services provided by the provider and the location of the provider. The location may be provided in terms of spatial coordinates such as a longitude and latitude of the service provider. These coordinates may be entered into the database by utilizing a street address of the service provider translated into coordinates by way of a GIS system or the coordinates may be obtained from an LFE based on the location of a wireless unit at the provider location as described above. The illustrated network 500 further includes a voice data

link 514 as described above, for allowing communication between the platform 508 and any of multiple service providers 520, 522 and 524.

The link 514 and/or switch 506 can be used to forward billing information a billing program or system 526. Such billing may encompass both billing for use of the location-based services program and for the transaction between the user and a service provider. For example, for credit card purchases, an account number and transaction amount may be transmitted to the credit card issuer and to a billing program that generates hard copy (or electronic) billing statements that are sent to the user. If the user is charged on a per-use basis for the location-based services, an appropriate record can be provided to the billing system 526 of the carrier/service provider. In this regard, as noted above, the switch 506 typically issues Call Detail Records (CDRs) to the billing system 526 relating to calls placed by users. The CDR includes a number of fields that identify the caller and provide various billing parameters. Certain fields of the CDR are undefined or otherwise available for use in connection with the location-based services program. One or more of these fields can be populated with values to identify a location based service that has been accessed by the user. This value can be recognized by the billing system 526 so that the user can be billed accordingly. If desired, the billing system 526 may also be used to bill for products or services purchased using the location-based services program. In this regard, the user may establish a credit or debit based account with the service provider. If the account has a pre-set limit, the switch 506 and/or link 514 may be used to obtain an approval prior to consummating transactions using the location-based service program.

Figure 6 is a flowchart illustrating a process that may be implemented in the network of Figure 5 involving identification of a number of service providers. It will be appreciated that the sequence of steps as shown in Figure 6 may be varied. The illustrated process 600 is initiated by receiving (602) a service request from a network user. For example, the service request may indicate that the user desires to receive a list of local service providers for providing a given type of services. Alternatively, the service request may provide an inquiry that the user desires to have transmitted to multiple local service providers. In the latter regard, the user may transmit a bid

indicating a price that the user is willing to pay for a particular service such as a hotel room. Alternatively, the user may request other information from multiple service providers such as an indication of room availability, forms of payment accepted, etc. The process 600 further involves determining (604) the wireless unit location. As described in co-pending application number 60/106,816, the location may be determined by accessing available location information stored in a location cache, may be determined based on the cell sector in which the wireless unit is located, or the location based services application may force an available LFE to make a location determination in response to the received service request.

In order to identify appropriate service providers, the process 600 further involves determining (606) the type of service requested. For example, the user may wish to identify hotels, restaurants, banks or a variety of other types of service providers. The type of service that the user desires may be identified in a variety of ways. For example, the service type may be entered via a keypad, e.g. – by entering *HOTEL or *ATM, or other code – or the service type may be indicated via a menu displayed on a graphical interface of the mobile unit. In addition, the providers may be identified based on personal information, such as service preferences as described above. The application may then access (608) the service provider database to identify appropriate service providers. In this regard, separate databases may be maintained for different types of service providers or appropriate service providers may be identified based on a service identifier associated with individual service provider records within the database.

The application then applies (610) selection criteria to identify a number of service providers. This may be implemented in various ways. For example, the user may specify the number of service providers to be identified, e.g., by entering a number such as "5" on a keypad or selecting a number from a menu. Alternatively, the application may include a default number of service providers to be identified. As a further alternative, the application may identify all appropriate service providers within a given geographical area, e.g., within a mile or within a geographic boundary, and may display the resulting list prioritized by location. If desired, the service

providers can be identified based on travel time or some other basis instead of distance.

In many cases, it will be desirable to identify the closest service providers. In such cases, proximity can be determined by simple mathematical techniques based on the coordinates of the mobile unit and the coordinates of the various service providers. The corresponding process for identifying The "n" closest service providers involves, for example, iteratively determining a distance for each appropriate service provider (or a subset of service providers within a geographic region or sub-region), ordering the providers based on distance, and selecting the first "n" service providers from the distance ordered list. To identify service providers within a geographic boundary, a quad-tree data structure may be utilized as described in co-pending application number 09/258,228, which is incorporated herein by reference. The quad-tree methodology can also be used to identify the closest "n" users by assigning coordinates to each quad-tree cell and then selecting the closest service providers as described above.

Once the service providers have been identified, the corresponding list of service providers may be transmitted (612) to the wireless unit and/or user information may be transmitted (614) to each of the identified providers. In the latter regard, the user information may include a bid for requested services or the like. The list may be ordered based on distance or other preference (e.g., cost, service quality, brand or chain preferences, etc.).

Figure 7 is a flowchart illustrating a location based auctioning process in accordance with the present invention. As noted above, the present invention makes use of location finding technology and interactive location based service functionality in order to provide interactive commerce type functionality in a variety of communications networks and provide unique location based interactive commerce capability for communications networks including wireless networks. The illustrated process 700 is initiated by receiving (702) a bid from a network user. For example, the bid may include a price which the user is willing to pay for services such as hotel room rental. In connection with the bid, the associated location based service application determines (704) the location of the subscriber equipment. In the case of a

wireless network, the location may be determined using any of the techniques discussed above. Because wireline equipment is stationary, corresponding location information (e.g., determined based on a service address using a GIS system) can be stored in a database. The illustrated process 700 further involves determining (706) the type of service for which the bid is submitted. As discussed above, the type of service may be determined based on information entered by the user on a keypad or in connection with a displayed menu or the like.

Based on the type of service involved, the application accesses (708) a service provider database to identify providers of the identified service type. From this database, the application identifies (710) a number of providers to receive the bid. The service providers may be identified based on location, time of travel or the like as discussed above. In addition, personal information such as service preferences may be considered. The application then transmits (712) the bid to the identified providers. The providers can then determine whether they wish to accept, reject or modify the bid. For example, a service provider may propose by way of a counteroffer a price somewhat higher than the bid price.

The application receives (714) the acceptance, rejection or modification from one or more of the identified service providers and transmits such information to the subscriber equipment. In the case where multiple service providers indicate acceptance, the application may be programmed to transmit only the first acceptance to the subscriber, or all of the acceptances may be transmitted to the subscriber who can then select as between the accepting providers. In the latter case, the transaction may be completed by transmitting a confirmation from the subscriber to the selected service provider. The acceptances transmitted to the subscriber may be ordered based on distance, service quality, brand name or chain preferences or other preferences.

The processing of the potential transaction varies depending on whether the service provider indicates acceptance, rejection or modification. If the bid is accepted (716) then the transaction may be completed as discussed above. If the bid is rejected (718) the process may be repeated, for example, with a new, and presumably higher, bid. If the bid is modified by way of a counterbid, the process continues by transmitting (722) the counterbid. In response to the counterbid, the application may

receive (722) a reply indicating acceptance, rejection or modification of the counterbid. This reply is then transmitted 726 to the desired party. As indicated by decision block 728, this process may be repeated until a counterbid is accepted.

The network of Figure 5 can also be used to "push" messages to users/subscribers. In this regard, users may register with a location based services program to indicate a willingness to receive such messages or to indicate an interest in receiving specific types of messages. For example, a user may wish to receive notifications of instant price reductions by vendors in the surrounding area. Conversely, vendors may wish to advertise such price reductions, e.g., to dispose of distressed inventory. For example, at a certain time at night, a hotel may be willing to reduce room rates and may wish to advertise this to people in the vicinity of the hotel. The location-based services program of the present invention allows such messages to be "pushed" to users, e.g., transmitted to user's without first receiving a request from the user. Preferably, such pushed messages will be transmitted with the user's consent. Other types of messages that may be pushed include, for example, local weather conditions, local traffic conditions, local points of interest information and other service product information.

While various embodiments of the present invention have been described in detail, it is apparent that further modifications and adaptations of the invention will occur to those skilled in the art. However, it is to be expressly understood that such modifications and adaptations are within the spirit and scope of the present invention.

What is claimed is:

1. A method for use in providing location-based services to a user of a communications network, comprising the steps of:

receiving a service request entered by said user employing user equipment, said service request including information regarding at least one criterion related to a requested service;

obtaining a location of said user equipment; and

providing access to said information of said service request to a plurality of service providers based on said obtained location so that said service providers can selectively respond to said service request including said criterion;

wherein said user is enabled to seek services meeting said criterion based on said location of said user equipment.

2. A method as set forth in Claim 1, wherein said information of said service request includes price information identifying a price which said user is willing to pay for said requested service.

3. A method as set forth in Claim 1, wherein said service request further includes service identification information identifying a type of said requested service.

4. A method as set forth in Claim 1, wherein said step of receiving comprises identifying a service request input entered via an input device of said user equipment.

5. A method as set forth in Claim 1, wherein said step of receiving comprises identifying a service code entered on a keypad of said user equipment.

6. A method as set forth in Claim 1, wherein said user equipment comprises a wireless unit and said step of obtaining a location comprises receiving location information from location finding equipment.

7. A method as set forth in Claim 1, wherein said step of obtaining location information is conducted in response to said step of receiving.

8. A method as set forth in Claim 1, wherein said step of providing access comprises comparing said location of said user equipment to a database of service provider locations to identify said plurality of service providers, and transmitting said information of said service request to each of said plurality of service providers.

9. A method as set forth in Claim 1, wherein said step of providing access comprises determining a type of services requested via said service request, identifying the closest predetermined number of service providers that provide the type of services requested, and transmitting said information of said service request to each of said predetermined number of service providers.

10. A method as set forth in Claim 1, further comprising receiving a response from at least one of said service providers, said response including responsive information indicating one of acceptance, rejection or a proposed modification of said criterion.

11. A method as set forth in Claim 10, further comprising fulfilling a transaction related to said service request between said user and one of said service providers by generating billing information regarding said transaction.

12. A method for use in providing location-based services to a user of a wireless communications network, comprising the steps of:

obtaining a location of a wireless unit associated with said user;

based on said obtained location of said wireless unit, identifying a number of providers for providing a first type of goods or services; and

after identifying said number of providers, performing one of the following steps:

a) transmitting user information regarding said user to each of said number of providers; and

b) transmitting provider information regarding each of said providers to said wireless unit of said user.

13. A method as set forth in Claim 12, wherein said step of obtaining a location of said wireless unit comprises receiving location information from location finding equipment.

14. A method as set forth in Claim 12, wherein said step of identifying a number of providers comprises identifying the closest predetermined number of providers for providing said first type of said goods or services.

15. A method as set forth in Claim 12, wherein said number of said providers is predetermined and said step of identifying comprises identifying up to said predetermined number of said providers.

16. A method as set forth in Claim 12, wherein said step of identifying comprises making distance determinations between said wireless unit and each of said number of providers.

17. A method as set forth in Claim 12, wherein said step of identifying comprises utilizing a quad-tree data structure to identify said number of providers.

18. A method as set forth in Claim 12, wherein said step of identifying comprises identifying providers within a defined geographic area.

19. A method as set forth in Claim 12, wherein said step of transmitting user information comprises transmitting information regarding service preferences.

20. A method as set forth in Claim 12, wherein said step of transmitting user information comprises transmitting a bid for said first type of goods or services.

21. A method as set forth in Claim 12, wherein said step of transmitting provider information comprises transmitting a list of the closest providers of said first type of said goods or services.

22. A method as set forth in Claim 12, further comprising fulfilling a transaction between said user and one of said number of providers related to said first type of goods and services by generating billing information regarding said transaction.

23. A method for use in providing location-based services to a user of a wireless communications network, comprising the steps of:

receiving a transaction offer entered using a wireless unit by a user of a wireless communications network, said offer including transaction type information identifying a first type of goods or services that are the subject of the transaction offer and transaction price information identifying a price which the user is willing to pay;

obtaining a location of said wireless unit;

based on said obtained location of said wireless unit, identifying a plurality of providers of said first type of goods or services;

transmitting offer information to each of said plurality of identified providers, said offer information including at least said price information identifying said price;

receiving a response from at least one of said identified providers, said response including responsive information indicating one of acceptance, rejection or a proposed modification of said price.

24. A method as set forth in Claim 23, wherein said step of receiving comprises receiving information entered by way of an input device of said wireless unit.

25. A method as set forth in Claim 23, wherein said step of obtaining a location of said wireless unit comprises receiving location information from location finding equipment.

26. A method as set forth in Claim 23, wherein said step of identifying a plurality of providers comprises identifying said plurality of providers based on proximity of said providers to said obtained location of said wireless unit.

27. A method as set forth in Claim 23, further comprising the step of transmitting information regarding said response to said wireless unit.

28. A method as set forth in Claim 23, further comprising fulfilling a transaction between said user at least one of said identified providers by generating billing information regarding said transaction.

29. A method for use in providing location-based services to a user of a communications network, comprising the steps of:

obtaining a location of user equipment of the user;

receiving a registration from the user indicating that the user is willing to receive at least a certain type of messages via said user equipment; and

based on said obtained location and said registration, transmitting a message to the user via the user equipment.

30. A method as set forth in Claim 29, wherein said user equipment comprises a wireless unit and said step of obtaining comprises receiving information from location finding equipment.

31. A method as set forth in Claim 29, wherein said step of receiving comprises obtaining consent from said user to permit transmission of messages to said user regarding one of service product information, weather conditions, traffic conditions and local points of interest information.

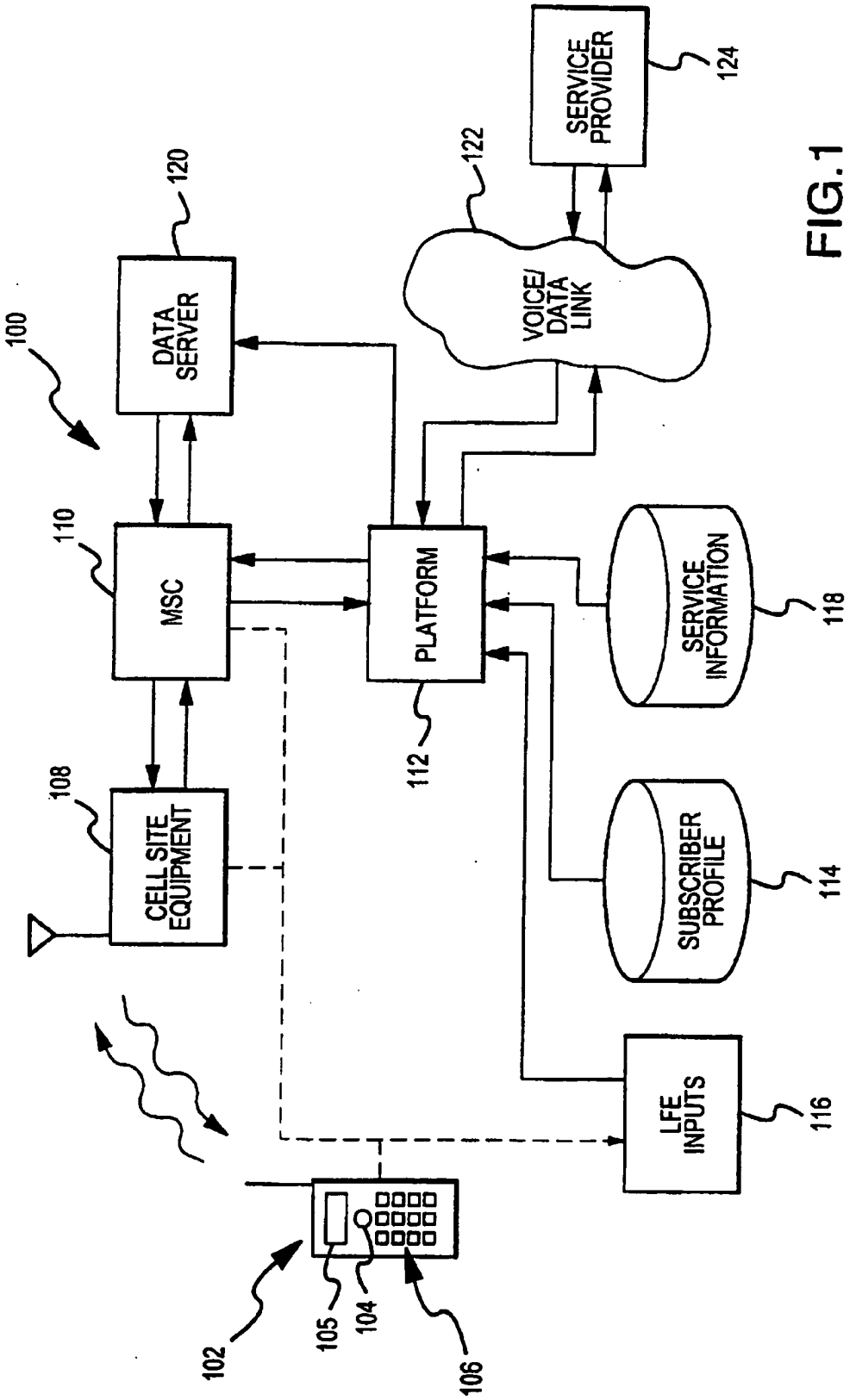

SERVICE PROVIDER
124
122
VOICE/ DATA LINK
120
DATA SERVER
100
110
MSC
PLATFORM
SERVICE INFORMATION
118
112
108
CELL SITE EQUIPMENT
SUBSCRIBER PROFILE
114
LFE INPUTS
116
102
105
104
106

FIG.1

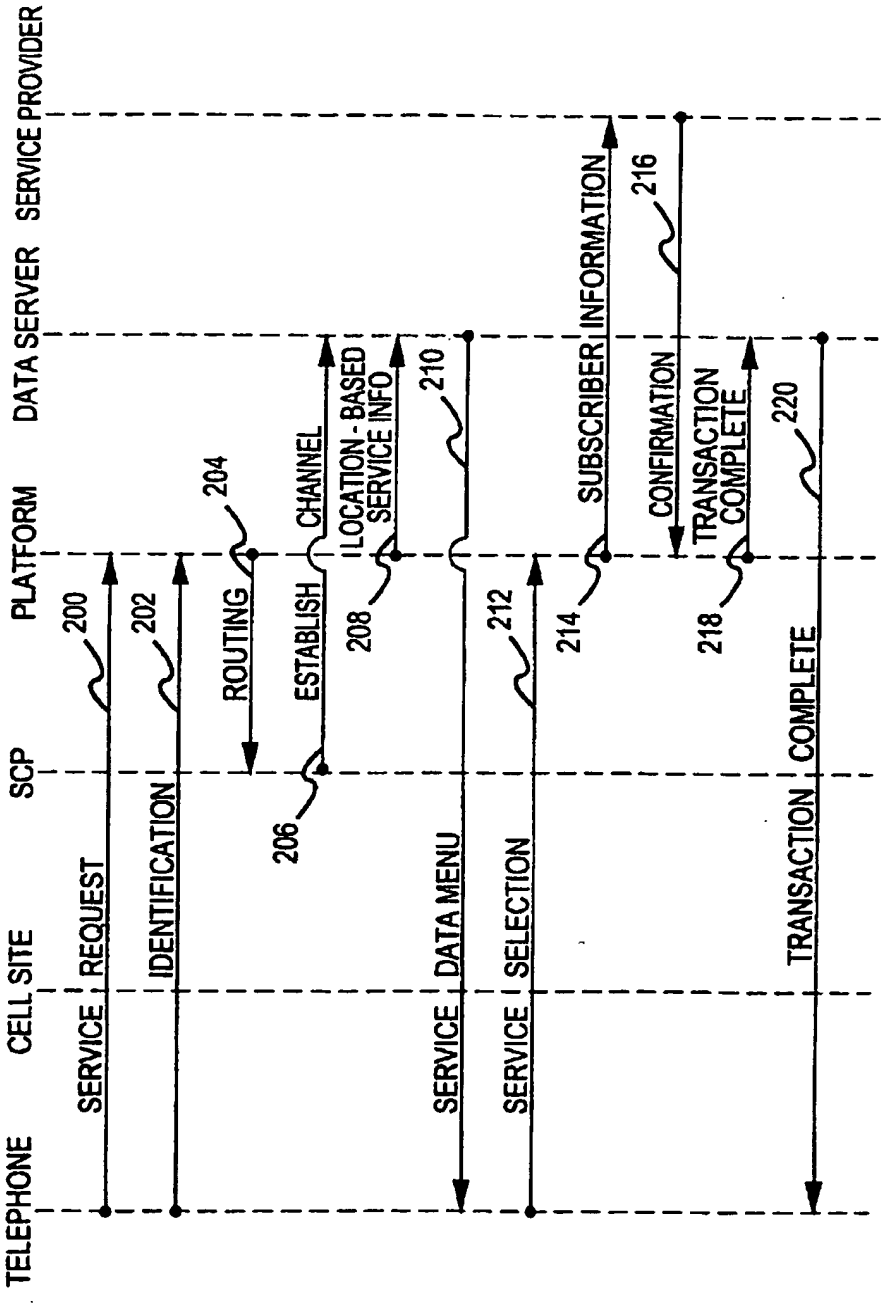

TELEPHONE
CELL SITE
SCP
PLATFORM
DATA SERVER
SERVICE PROVIDER
SERVICE REQUEST
200
IDENTIFICATION
202
ROUTING
204
206
ESTABLISH CHANNEL
208
LOCATION - BASED SERVICE INFO
210
SERVICE DATA MENU
SERVICE SELECTION
212
214
SUBSCRIBER INFORMATION
216
CONFIRMATION
218
TRANSACTION COMPLETE
220
TRANSACTION COMPLETE

FIG.2

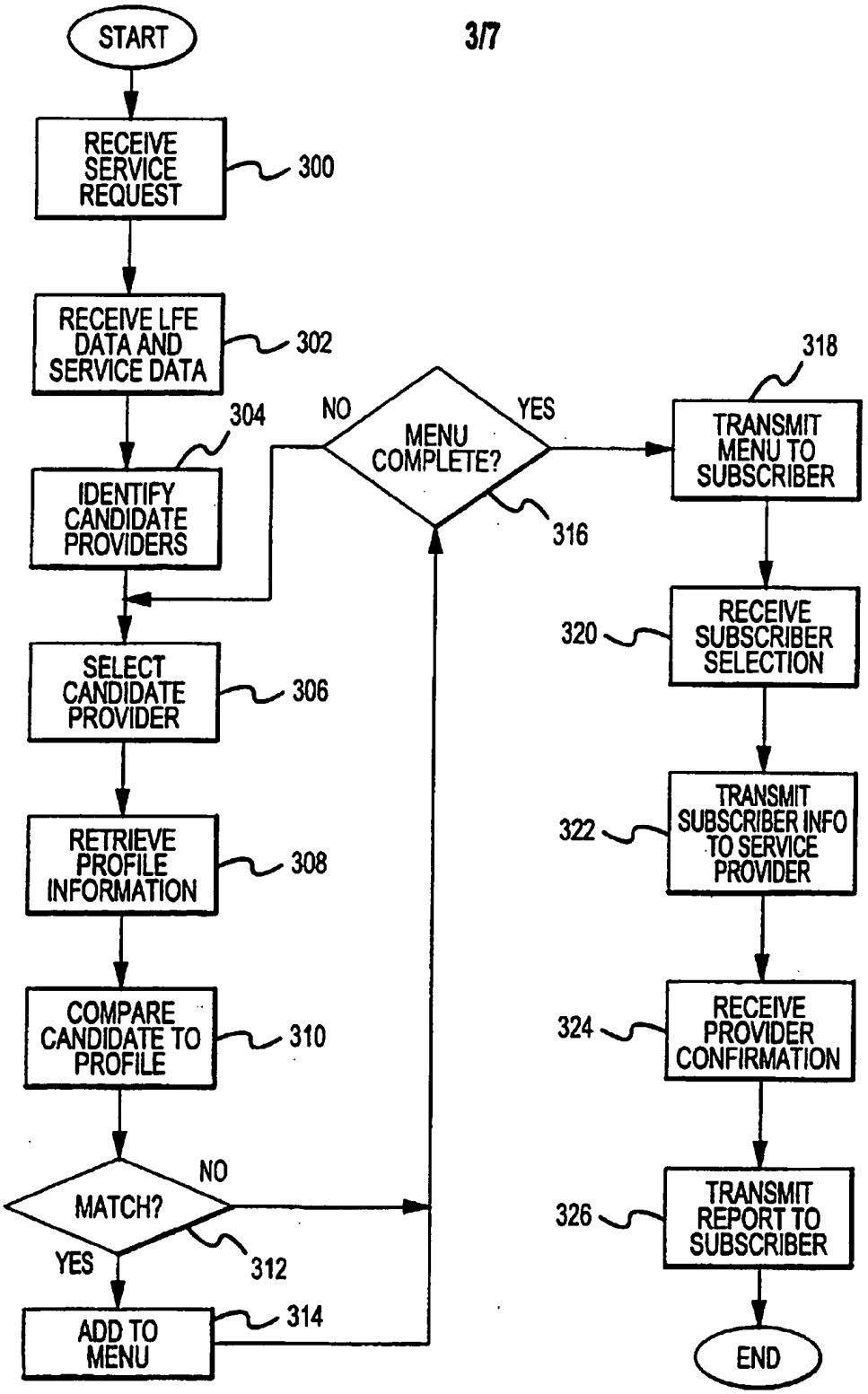

START
RECEIVE SERVICE REQUEST
300
RECEIVE LFE DATA AND SERVICE DATA
302
IDENTIFY CANDIDATE PROVIDERS
304
SELECT CANDIDATE PROVIDER
306
RETRIEVE PROFILE INFORMATION
308
COMPARE CANDIDATE TO PROFILE
310
MATCH?
NO
YES
312
ADD TO MENU
314
MENU COMPLETE?
NO
YES
316
TRANSMIT MENU TO SUBSCRIBER
318
RECEIVE SUBSCRIBER SELECTION
320
TRANSMIT SUBSCRIBER INFO TO SERVICE PROVIDER
322
RECEIVE PROVIDER CONFIRMATION
324
TRANSMIT REPORT TO SUBSCRIBER
326
END

FIG.3

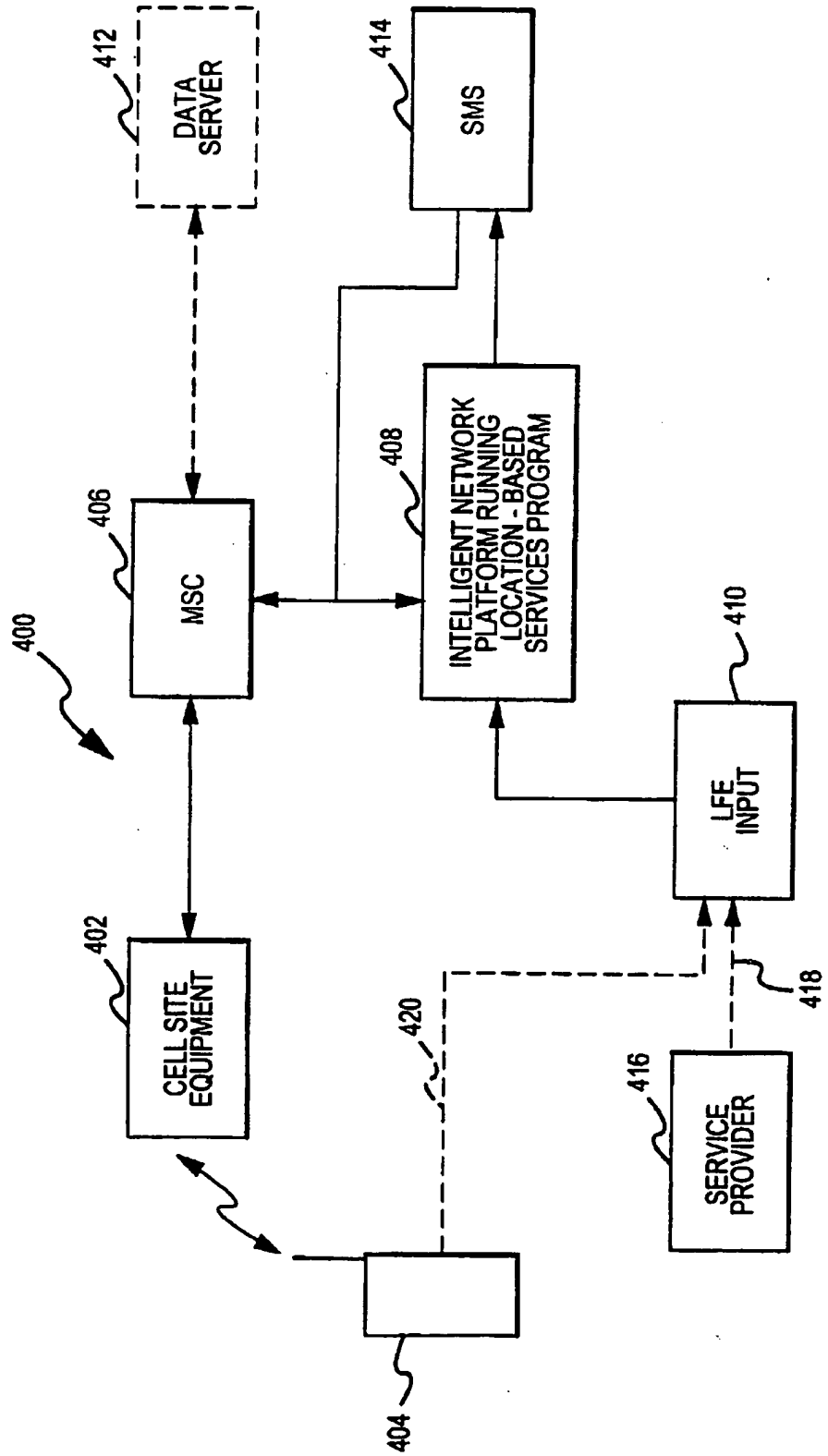

412
DATA SERVER
414
SMS
408
INTELLIGENT NETWORK PLATFORM RUNNING LOCATION - BASED SERVICES PROGRAM
406
MSC
400
410
LFE INPUT
402
CELL SITE EQUIPMENT
418
420
416
SERVICE PROVIDER
404

FIG.4

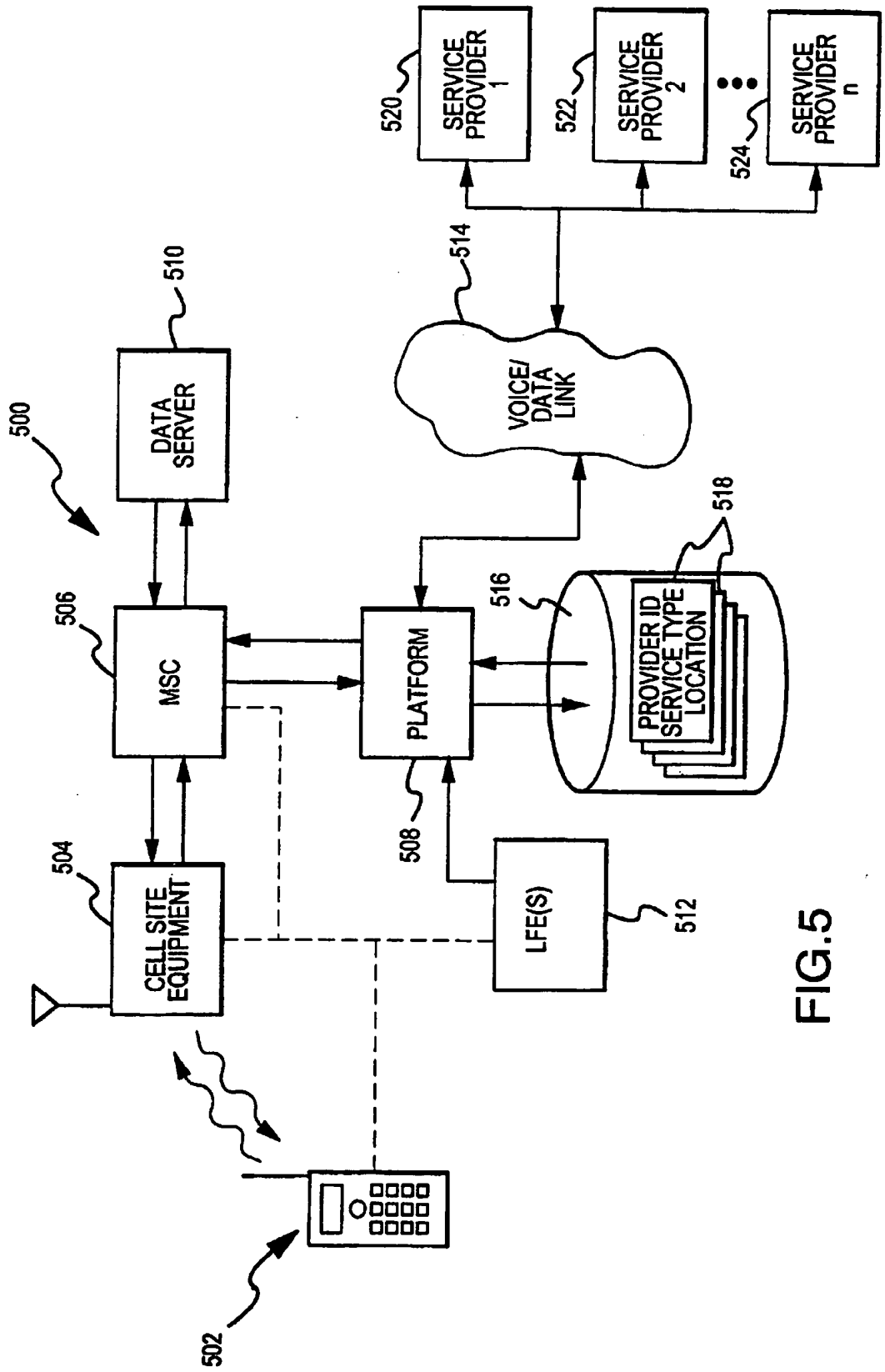

SERVICE PROVIDER 1
SERVICE PROVIDER 2
SERVICE PROVIDER n
520
522
524
514
VOICE/ DATA LINK
510
DATA SERVER
500
518
516
PROVIDER ID SERVICE TYPE LOCATION
506
MSC
PLATFORM
508
504
CELL SITE EQUIPMENT
LFE(S)
512
502

FIG.5

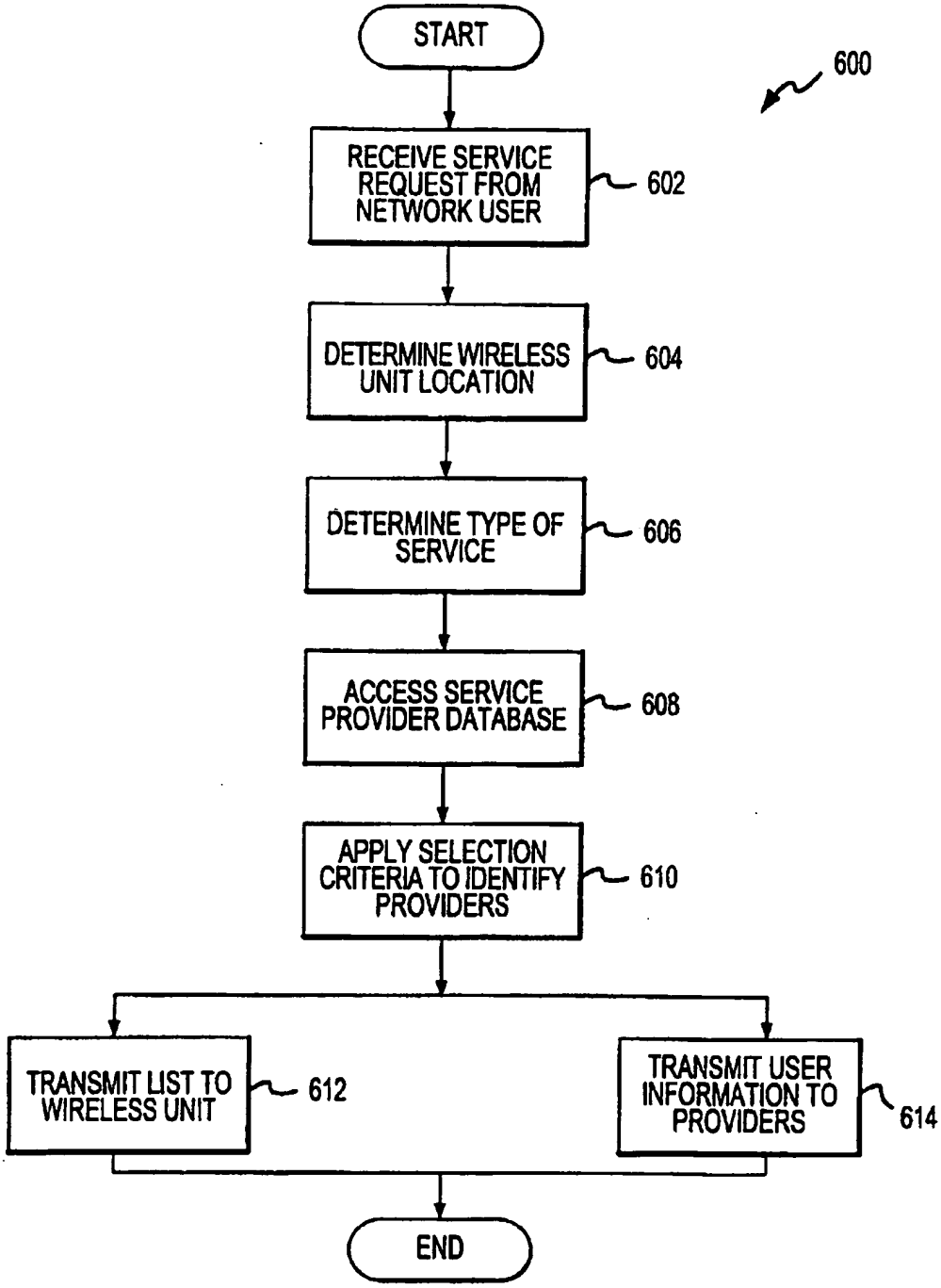

START
600
RECEIVE SERVICE REQUEST FROM NETWORK USER
602
DETERMINE WIRELESS UNIT LOCATION
604
DETERMINE TYPE OF SERVICE
606
ACCESS SERVICE PROVIDER DATABASE
608
APPLY SELECTION CRITERIA TO IDENTIFY PROVIDERS
610
TRANSMIT LIST TO WIRELESS UNIT
612
TRANSMIT USER INFORMATION TO PROVIDERS
614
END

FIG.6

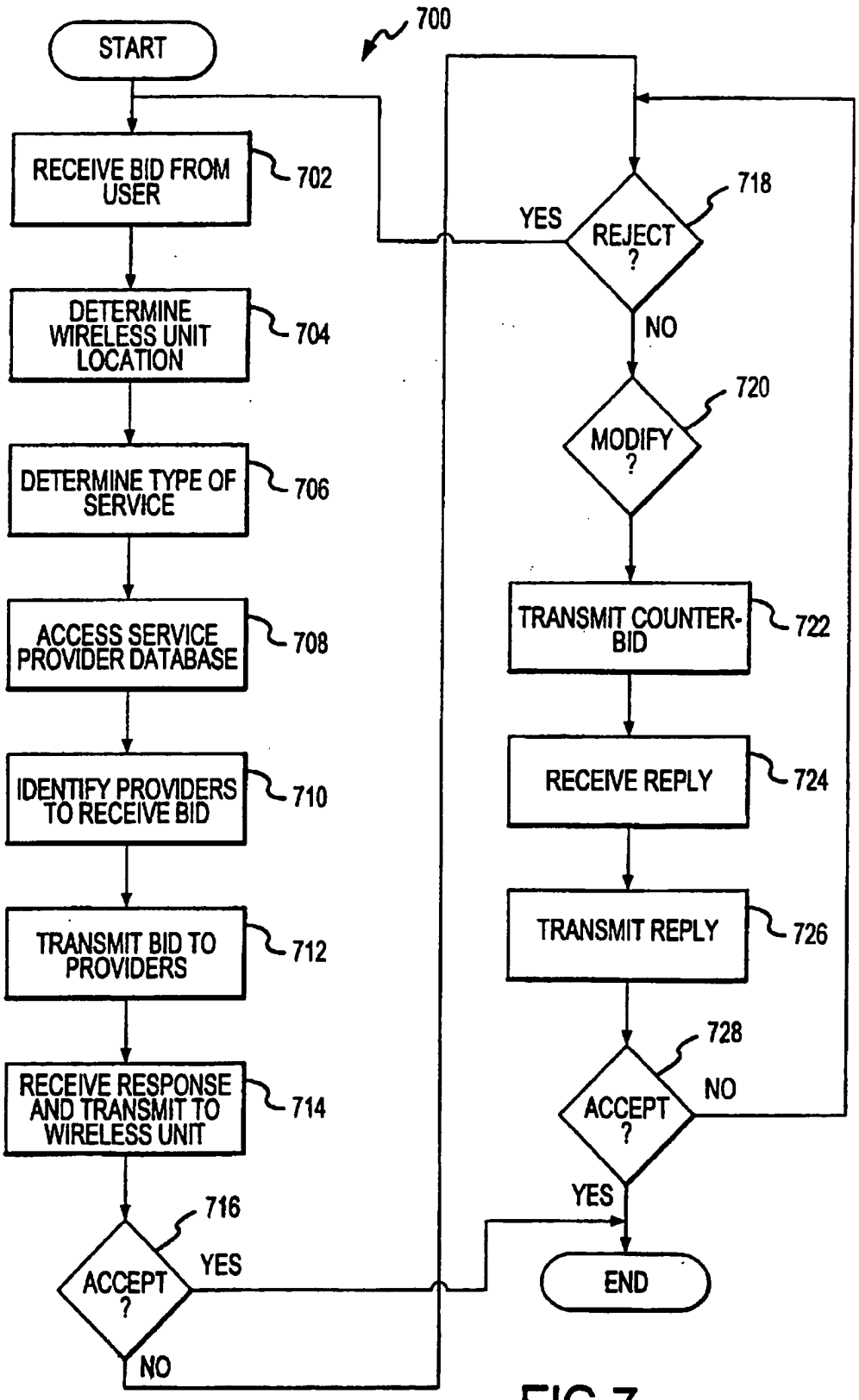

700
START
RECEIVE BID FROM USER
702
DETERMINE WIRELESS UNIT LOCATION
704
DETERMINE TYPE OF SERVICE
706
ACCESS SERVICE PROVIDER DATABASE
708
IDENTIFY PROVIDERS TO RECEIVE BID
710
TRANSMIT BID TO PROVIDERS
712
RECEIVE RESPONSE AND TRANSMIT TO WIRELESS UNIT
714
716
ACCEPT ?
YES
NO
718
REJECT ?
YES
NO
720
MODIFY ?
TRANSMIT COUNTER-BID
722
RECEIVE REPLY
724
TRANSMIT REPLY
726
728
ACCEPT ?
NO
YES
END

FIG.7

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/26727

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : H04Q 7/20
US CL : 455/456

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/456,412,414,461,517; 379/207,201,211; 342/357; 340/825.36,825.49,905,995; 701/213,208,211,117,201

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | US 5,930,699 A (BHATIA) 27 JULY 1999, SEE FIGS. 1-2 | 1-31 |
| X | US 5,948,040 A (DELORME ET AL.) 07 SEPTEMBER 1999, SEE FIGS. 9A AND 9B | 1-31 |

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

| | | | |
|---|---|---|---|
| * | Special categories of cited documents: | "T" | later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "A" | document defining the general state of the art which is not considered to be of particular relevance | "X" | document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "E" | earlier document published on or after the international filing date | "Y" | document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" | document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" | document member of the same patent family |
| "O" | document referring to an oral disclosure, use, exhibition or other means | | |
| "P" | document published prior to the international filing date but later than the priority date claimed | | |

| | |
|---|---|
| Date of the actual completion of the international search<br>10 NOVEMBER 2000 | Date of mailing of the international search report<br>06 DEC 2000 |
| Name and mailing address of the ISA/US<br>Commissioner of Patents and Trademarks<br>Box PCT<br>Washington, D.C. 20231<br>Facsimile No. (703) 305-3230 | Authorized officer<br>MARSHA D. BANKS-HAROLD<br>Telephone No. (703) 305-4700 |

Form PCT/ISA/210 (second sheet) (July 1998)*